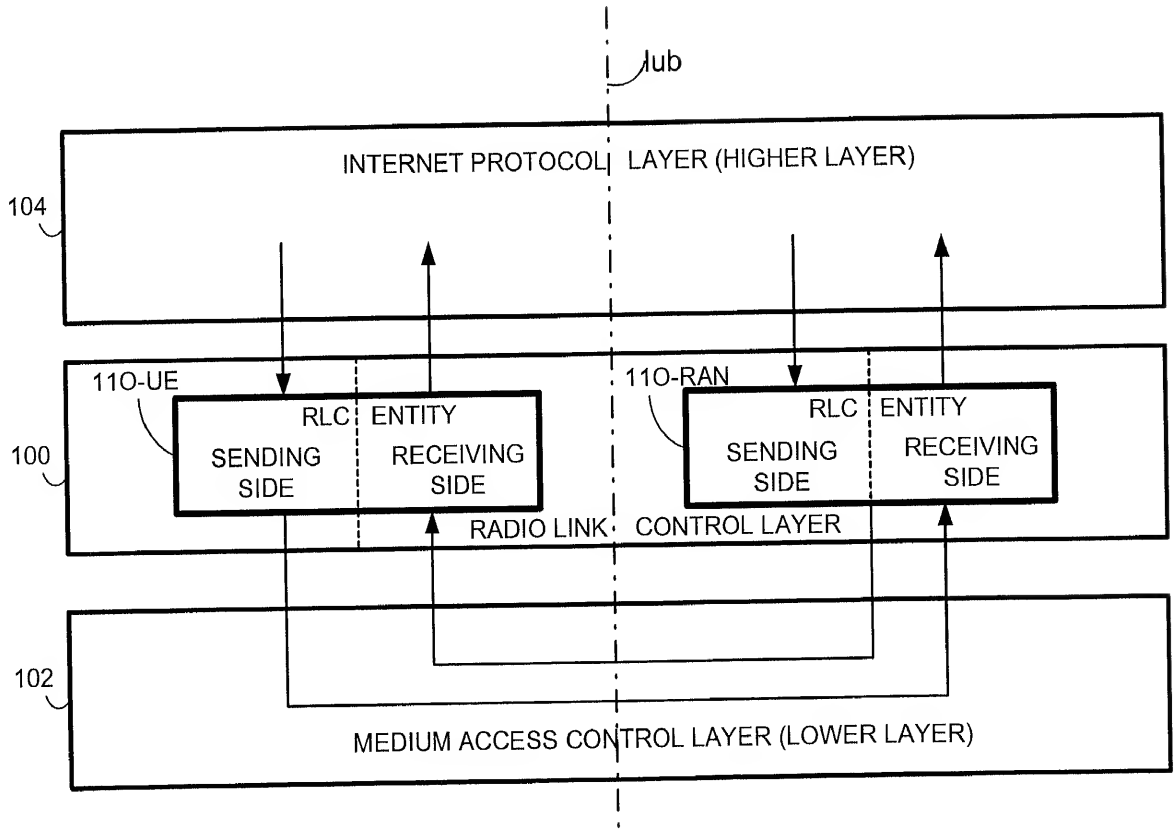
Iub
INTERNET PROTOCOL LAYER (HIGHER LAYER)
104
110-UE
RLC ENTITY
SENDING SIDE
RECEIVING SIDE
110-RAN
RLC ENTITY
SENDING SIDE
RECEIVING SIDE
100
RADIO LINK CONTROL LAYER
102
MEDIUM ACCESS CONTROL LAYER (LOWER LAYER)

Fig. 1

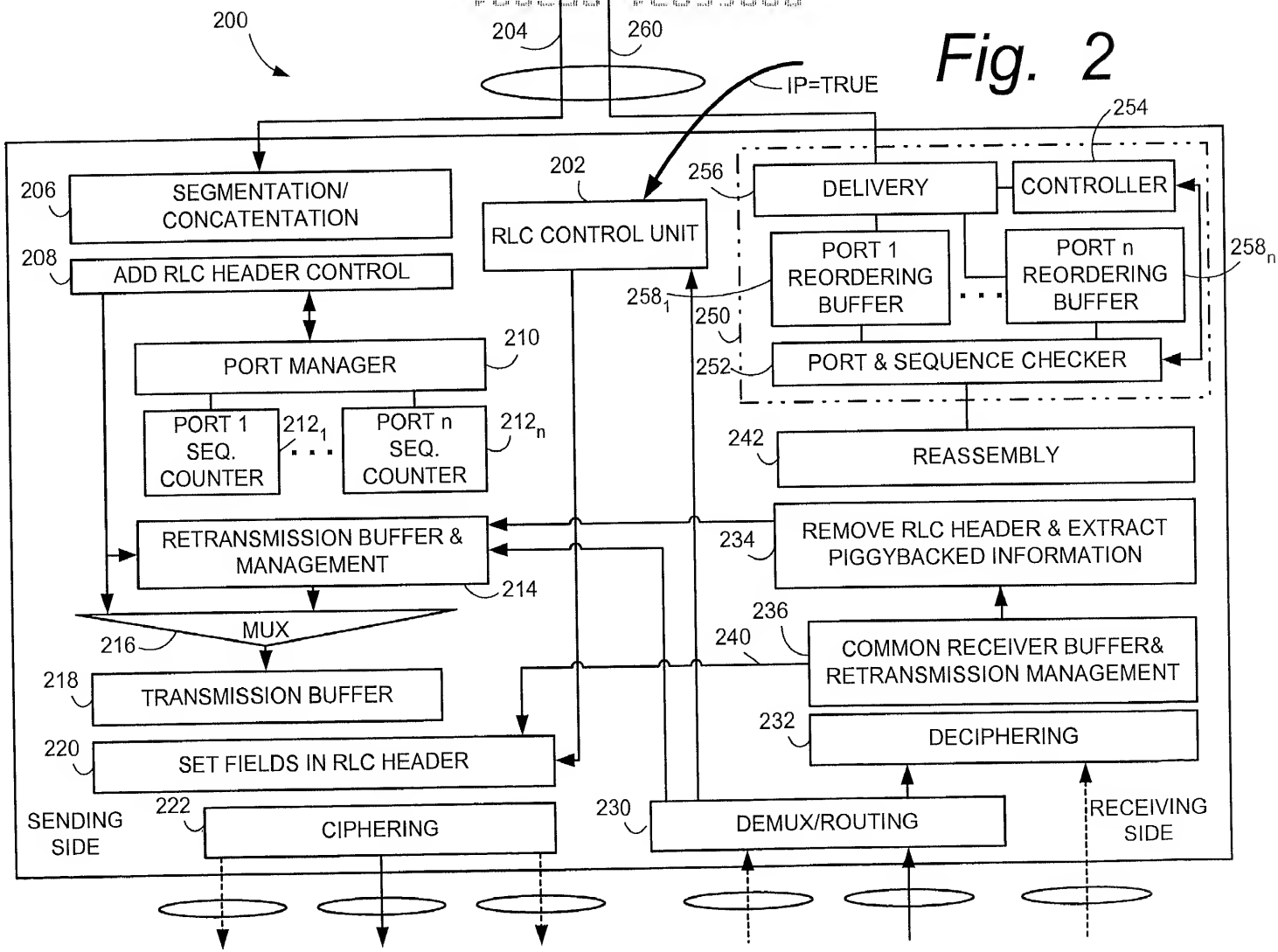
200
204
260
IP=TRUE
254
206
SEGMENTATION/
CONCATENTATION
202
256
DELIVERY
CONTROLLER
208
ADD RLC HEADER CONTROL
RLC CONTROL UNIT
PORT 1
REORDERING
BUFFER
PORT n
REORDERING
BUFFER
258n
2581
250
PORT MANAGER
210
252
PORT & SEQUENCE CHECKER
PORT 1
SEQ.
COUNTER
2121
PORT n
SEQ.
COUNTER
212n
242
REASSEMBLY
RETRANSMISSION BUFFER &
MANAGEMENT
234
REMOVE RLC HEADER & EXTRACT
PIGGYBACKED INFORMATION
214
MUX
216
236
240
COMMON RECEIVER BUFFER&
RETRANSMISSION MANAGEMENT
218
TRANSMISSION BUFFER
232
DECIPHERING
220
SET FIELDS IN RLC HEADER
SENDING
SIDE
222
CIPHERING
230
DEMUX/ROUTING
RECEIVING
SIDE

Fig. 2

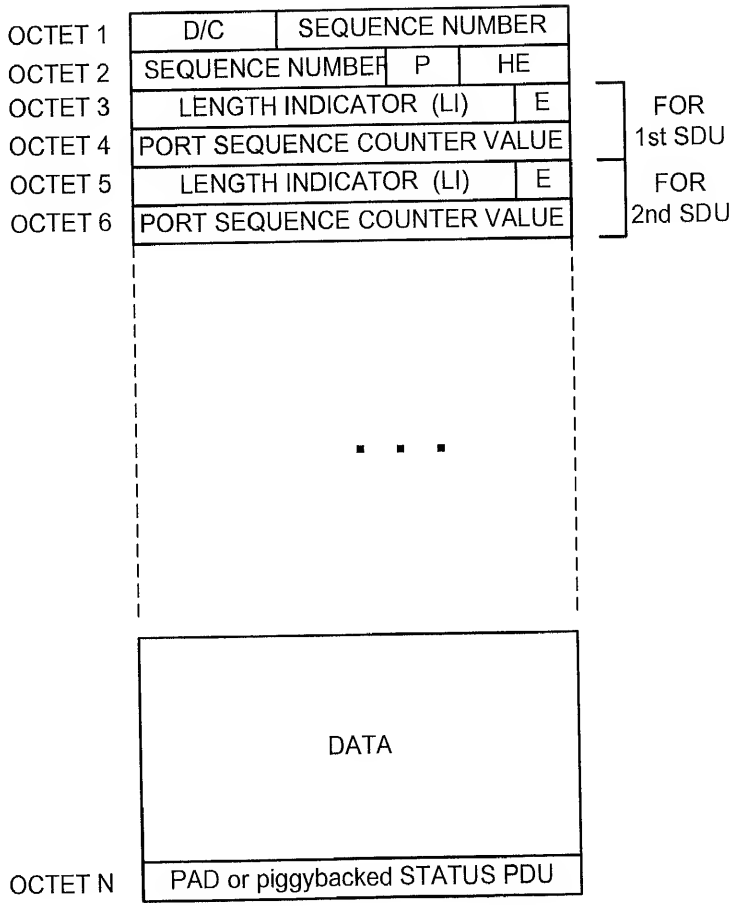
OCTET 1
OCTET 2
OCTET 3
OCTET 4
OCTET 5
OCTET 6
OCTET N
D/C
SEQUENCE NUMBER
SEQUENCE NUMBER
P
HE
LENGTH INDICATOR (LI)
E
PORT SEQUENCE COUNTER VALUE
LENGTH INDICATOR (LI)
E
PORT SEQUENCE COUNTER VALUE
FOR 1st SDU
FOR 2nd SDU
DATA
PAD or piggybacked STATUS PDU

Fig. 3

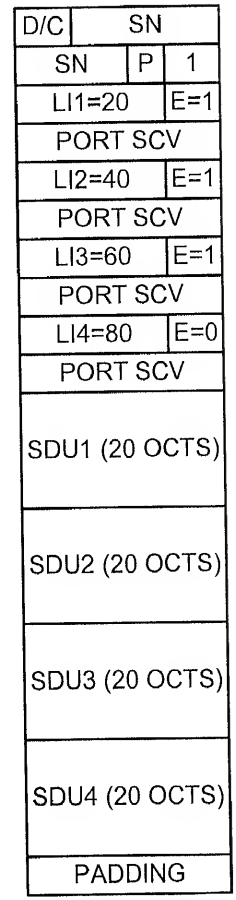
D/C
SN
SN
P
1
LI1=20
E=1
PORT SCV
LI2=40
E=1
PORT SCV
LI3=60
E=1
PORT SCV
LI4=80
E=0
PORT SCV
SDU1 (20 OCTS)
SDU2 (20 OCTS)
SDU3 (20 OCTS)
SDU4 (20 OCTS)
PADDING

Fig. 3A

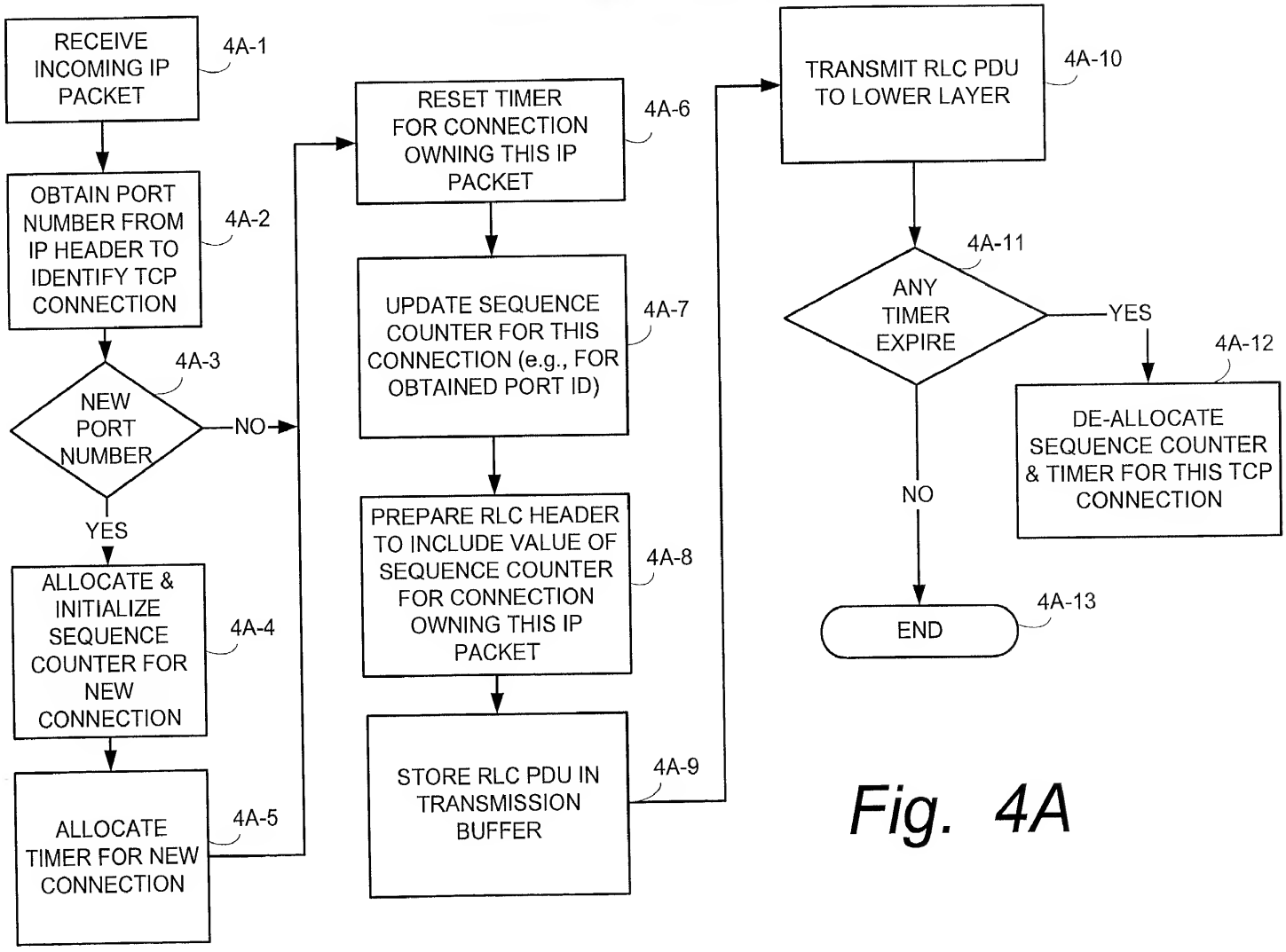
RECEIVE INCOMING IP PACKET
4A-1
OBTAIN PORT NUMBER FROM IP HEADER TO IDENTIFY TCP CONNECTION
4A-2
NEW PORT NUMBER
4A-3
NO
YES
ALLOCATE & INITIALIZE SEQUENCE COUNTER FOR NEW CONNECTION
4A-4
ALLOCATE TIMER FOR NEW CONNECTION
4A-5
RESET TIMER FOR CONNECTION OWNING THIS IP PACKET
4A-6
UPDATE SEQUENCE COUNTER FOR THIS CONNECTION (e.g., FOR OBTAINED PORT ID)
4A-7
PREPARE RLC HEADER TO INCLUDE VALUE OF SEQUENCE COUNTER FOR CONNECTION OWNING THIS IP PACKET
4A-8
STORE RLC PDU IN TRANSMISSION BUFFER
4A-9
TRANSMIT RLC PDU TO LOWER LAYER
4A-10
ANY TIMER EXPIRE
4A-11
YES
NO
DE-ALLOCATE SEQUENCE COUNTER & TIMER FOR THIS TCP CONNECTION
4A-12
END
4A-13

Fig. 4A

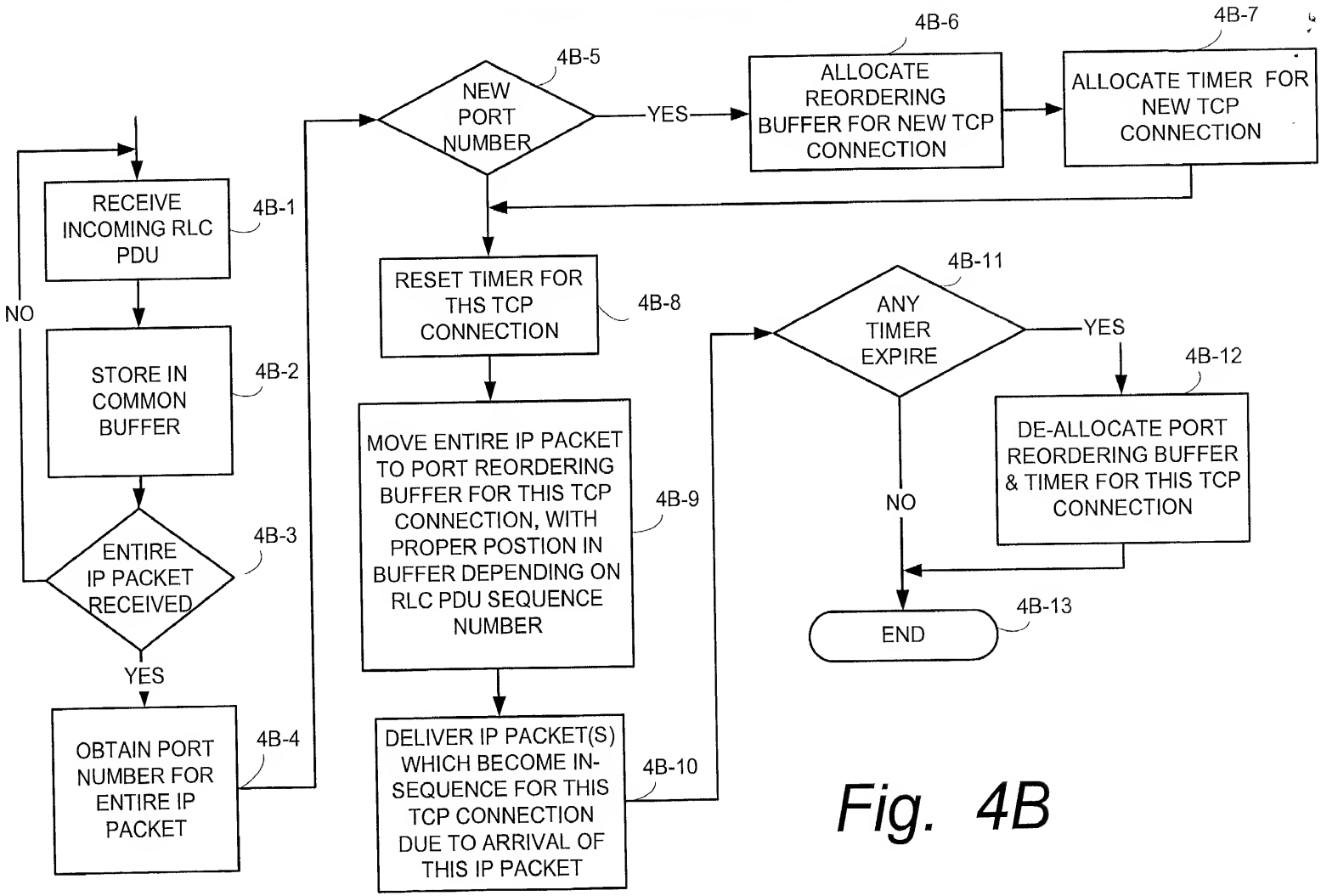
RECEIVE INCOMING RLC PDU
4B-1
STORE IN COMMON BUFFER
4B-2
ENTIRE IP PACKET RECEIVED
4B-3
NO
YES
OBTAIN PORT NUMBER FOR ENTIRE IP PACKET
4B-4
NEW PORT NUMBER
4B-5
YES
ALLOCATE REORDERING BUFFER FOR NEW TCP CONNECTION
4B-6
ALLOCATE TIMER FOR NEW TCP CONNECTION
4B-7
RESET TIMER FOR THS TCP CONNECTION
4B-8
MOVE ENTIRE IP PACKET TO PORT REORDERING BUFFER FOR THIS TCP CONNECTION, WITH PROPER POSTION IN BUFFER DEPENDING ON RLC PDU SEQUENCE NUMBER
4B-9
DELIVER IP PACKET(S) WHICH BECOME IN-SEQUENCE FOR THIS TCP CONNECTION DUE TO ARRIVAL OF THIS IP PACKET
4B-10
ANY TIMER EXPIRE
4B-11
YES
NO
DE-ALLOCATE PORT REORDERING BUFFER & TIMER FOR THIS TCP CONNECTION
4B-12
END
4B-13

Fig. 4B

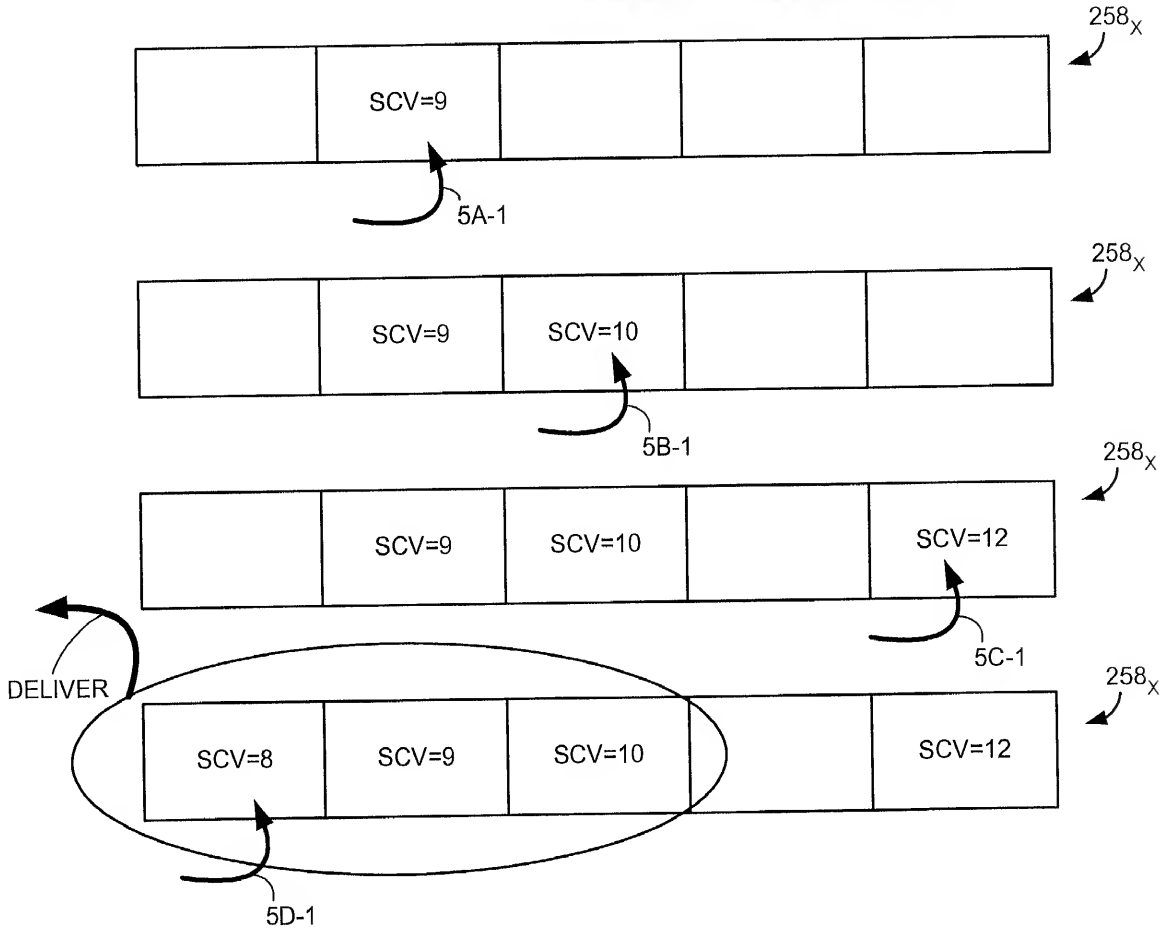

Fig. 5A

Fig. 5B

Fig. 5C

Fig. 5D

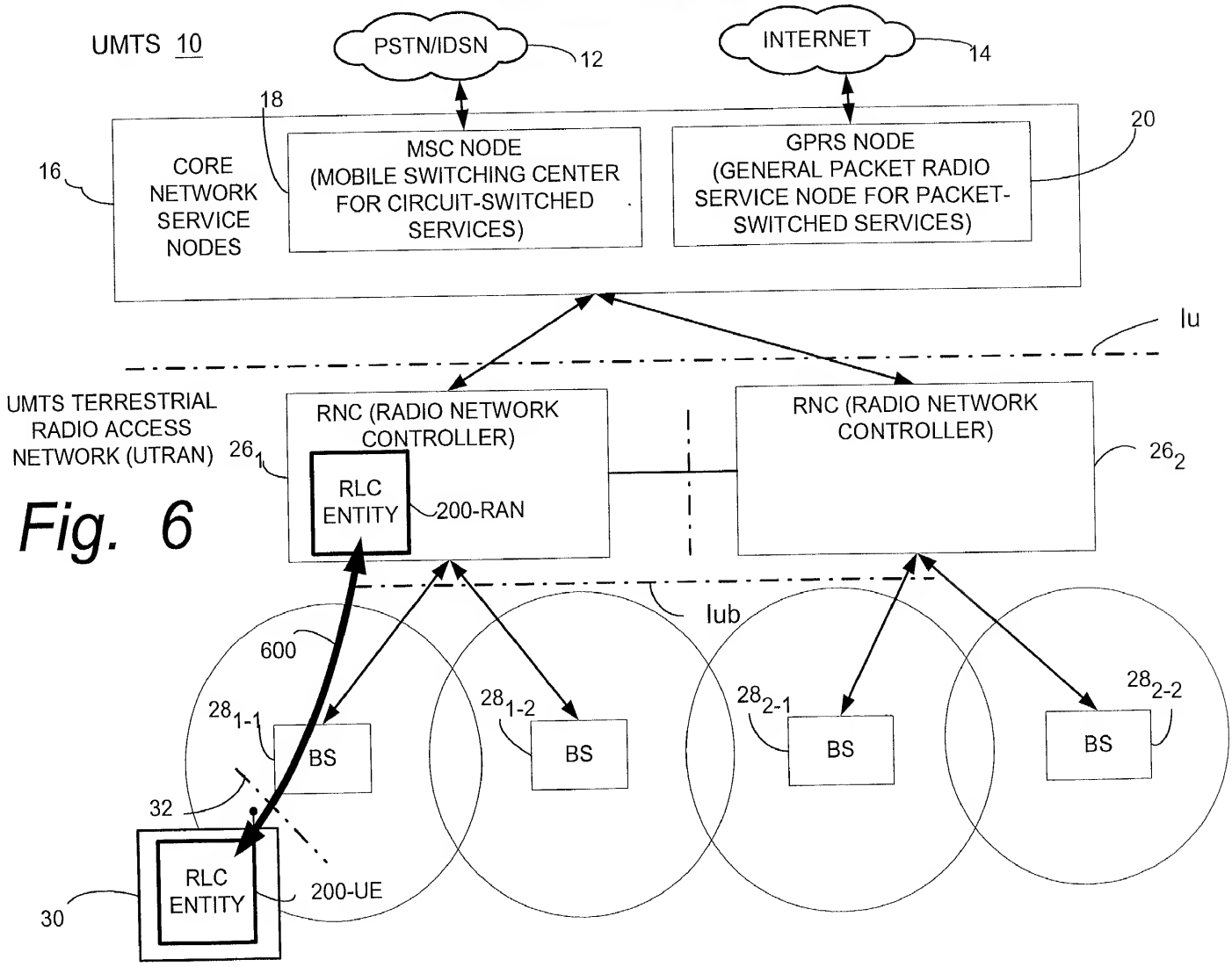
UMTS 10
PSTN/IDSN
12
INTERNET
14
18
20
16
CORE NETWORK SERVICE NODES
MSC NODE (MOBILE SWITCHING CENTER FOR CIRCUIT-SWITCHED SERVICES)
GPRS NODE (GENERAL PACKET RADIO SERVICE NODE FOR PACKET-SWITCHED SERVICES)
Iu
UMTS TERRESTRIAL RADIO ACCESS NETWORK (UTRAN)
RNC (RADIO NETWORK CONTROLLER)
26 1
RLC ENTITY
200-RAN
RNC (RADIO NETWORK CONTROLLER)
26 2
Iub
600
28 1-1
BS
28 1-2
BS
28 2-1
BS
28 2-2
BS
32
RLC ENTITY
200-UE
30

Fig. 6

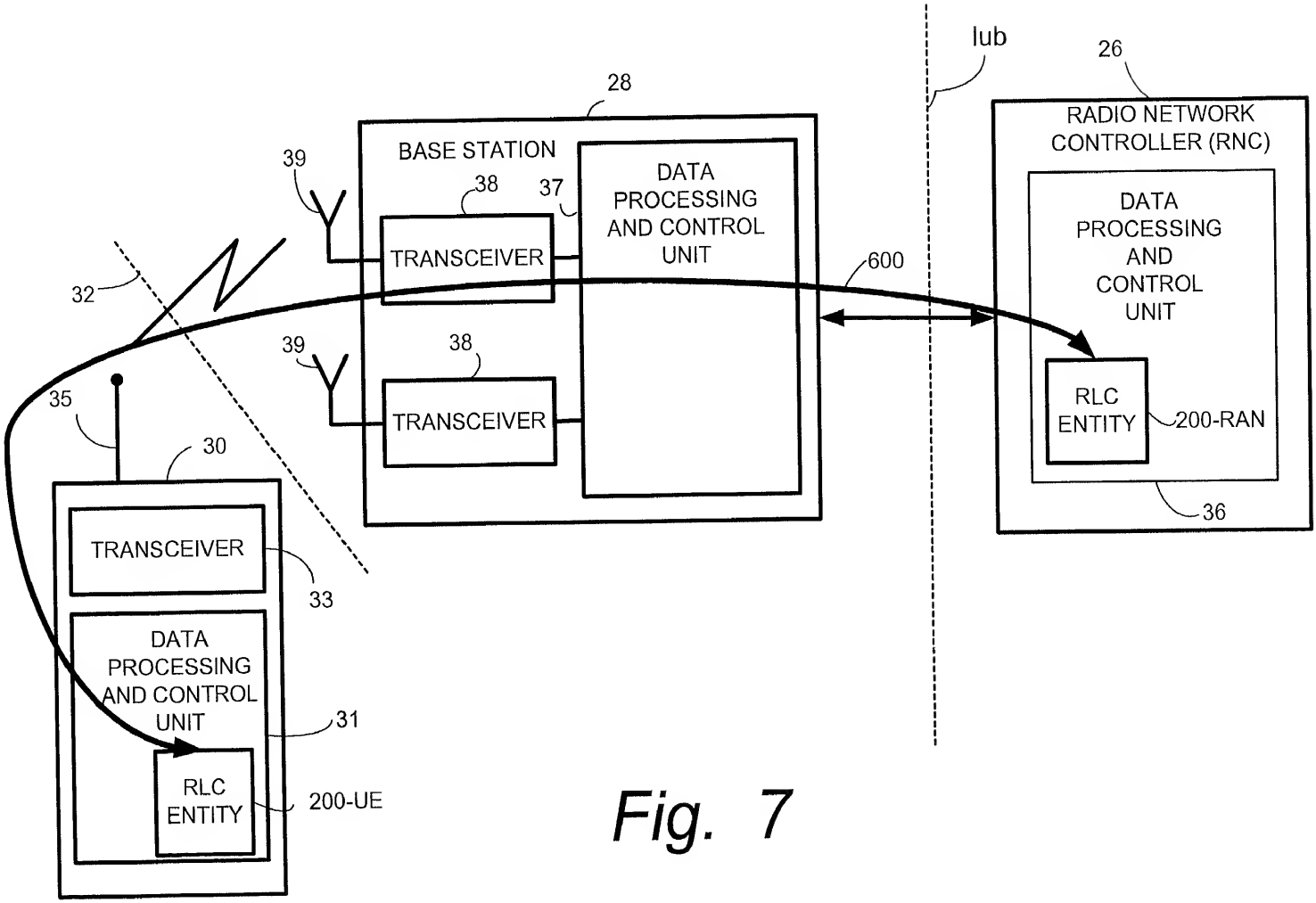
lub
26
28
RADIO NETWORK CONTROLLER (RNC)
BASE STATION
39
38
37
DATA PROCESSING AND CONTROL UNIT
TRANSCEIVER
600
32
39
38
DATA PROCESSING AND CONTROL UNIT
RLC ENTITY
200-RAN
TRANSCEIVER
35
30
36
TRANSCEIVER
33
DATA PROCESSING AND CONTROL UNIT
31
RLC ENTITY
200-UE

Fig. 7

EP 1 699 860 A1

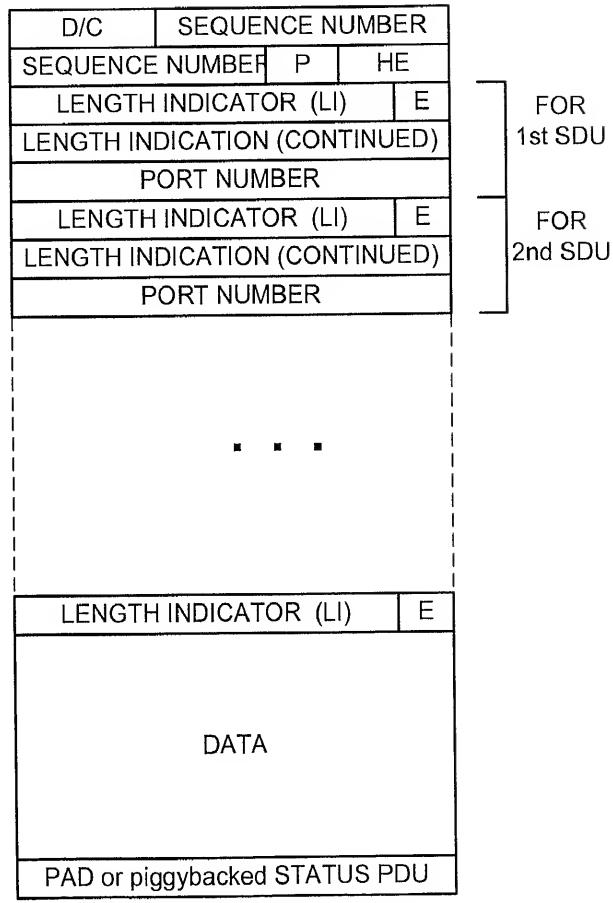

Fig. 8